

REMARKS

Claims 31-40 are currently pending in this application. Claims 8-14 and 17-30 have been canceled. No new matter has been added to this application.

Rejection of Claim 8-14 and 17-30 under 35 U.S.C. § 103 (a)

The Examiner has rejected claims 8-14 and 17-30 under 35 U.S.C. § 103 (a) as being unpatentable over U.S. Patent No. 6,346,940, (Fukunaga) in view of U.S. Patent No. 5,638,819 (Manwaring). The Examiner correctly notes that Fukunaga does not teach or disclose a depth marker. The Examiner contends that Manwaring discloses position data for an instrument in an x, y, z coordinate system and that z represents depth. The Examiner argues that it would have been obvious to a person of ordinary skill in the art to combine the teaching of Manwaring in the Fukunaga device to obtain depth information. Applicants respectfully traverse the rejection.

Applicants have canceled claims 8-14 and 17-30 and replaced them with new claims 31-40. Applicants will address the Examiner's rejection with respect to the new claims.

Applicants' invention is directed to a method and apparatus for augmented reality guided positioning of an instrument tip within a target located in an object. An augmented reality view is presented by overlaying a virtual graphics guide onto a real view of the object and an instrument. The graphics guide comprises a virtual depth marker located outside of the object. The instrument is aligned to the graphics guide. The instrument is inserted to a depth determined in the augmented view by alignment of a predetermined portion of the instrument with the virtual depth marker.

Fukunaga discloses an image processing system for displaying an endoscopic image of a three dimensional object from a desired viewpoint direction. Guiding markers indicate the direction in which the real or virtual

endoscope is to be advanced. The virtual endoscopic image helps the user to navigate the real endoscope by comparing the virtual and the real endoscopic views side-by-side. These two views are separate from each other; they are not overlaid, and they are not metrically mapped onto each other. As acknowledged by the Examiner, Fukunaga does not teach or disclose a virtual depth marker which assists the user to insert the instrument to a predetermined depth by aligning a predetermined portion of the instrument with the virtual depth marker.

Manwaring discloses a system for presenting guidance information to a user engaged in guiding a probe to a target within a body. Unlike the present invention, Manwaring tracks the movement of the probe within the body and has the 3D position of the probe readily available. The present invention does not track the movement of the instrument; the 3D position of the instrument is not known to the system, only observed by the user. The present invention provides an augmented reality view with an external gauge (i.e., the virtual graphic marker) which allows the user to know the depth of the instrument when a predetermined portion of the instrument is aligned with the virtual graphics marker. As indicated in claims 31 and 36, the virtual graphics marker is located outside of the object and visible to the user. Applicants respectfully submit that the approach of the present invention is significantly different from that of Manwaring.

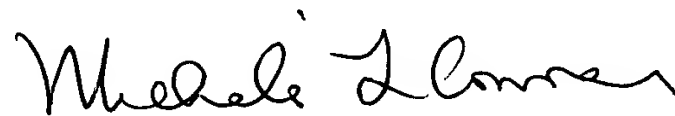
Applicants further submit that the combination of Fukunaga and Manwaring do not teach or disclose Applicants' invention. Neither Fukunaga nor Manwaring, whether taken alone or in combination, teach or disclose a virtual graphics marker located outside of an object which is used to align a predetermined portion of an instrument in order to determine the depth of the instrument within the object relative to a target. Applicants respectfully request that the rejection under 35 U.S.C. § 103 (a) be withdrawn.

• Appl. No. 09/818,123
Amdt. dated May 17, 2005
Reply to Office Action of January 28, 2005

Conclusion

Applicants respectfully submit that claims 31-40 are in condition for allowance and request that a timely Notice of Allowance be issued in this case. The Examiner is invited to contact the undersigned should he have any questions in this matter.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Michele L. Conover". The signature is fluid and cursive, with the first name "Michele" being more prominent than the last name "Conover".

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